Watson Names:

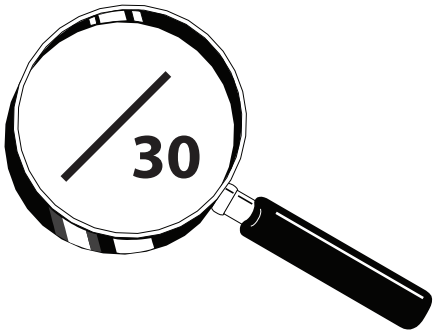
_____

_____

_____

_____

Period: _____ Table: _____



General Chemistry 2.1

Insulation Mystery

Worksheet

My Dear Watsons,

We have another mystery to solve. This one is a cold case. It seems, for years, the school board is investigating different insulation materials for the school. They have tasked us to test three of their choices – cotton, air and steel wool. Follow the directions carefully.

Good Luck,

Sherlock Holmes

aka Mr. Aff

What do you know?

Let's see what you know about insulation... As a group, discuss and circle your answer on this sheet.

1. True / False Insulators don't allow heat to pass through them easily.

2. True / False Metals make good insulators.

3. True / False A good insulator will make an object get warmer.

4. True / False Heat flows from hot to cold.

Hypothesis

As a group, make your hypothesis. Rank the insulators from Best to Worst. Remember Cotton, Air and Steel Wool are our choices. Place the names in the space provided.

_____ _____ _____

Best Insulator Worst Insulator

Roles

This time we will have four roles. The roles will be rotated after each trial. The role schedule is in your folder. The roles and responsibilities are as follows:

Time Keeper - Tells the Temperature Reader when to read the Temperature

Temperature Reader - Reads the temperature and tells the Data Recorder

Mechanic - Holds the sample in the ice during the trial

Data Recorder - Records the temperature on the Data Chart

See your folder for further instructions...

Cold Case... Insulation Mystery

Role Schedule

Role \ Trial	Cotton	Air	Steel Wool
Time Keeper			
Temperature Reader			
Mechanic			
Data Recorder			

Procedure

Get ready...

1. **Mechanic** fill the styrofoam cup with ice water.
   - Find the Cotton container.
   - Place the Thermometer in the Cotton container.
   - *DO NOT ALLOW THE THERMOMETER BULB TOUCH THE CONTAINER WALL.*
   - *DO NOT PUT IN ICE WATER YET.*
2. **Time Keeper** find the Stop Watch. In 1 minute tell the Temperature Reader to read the temperature.
3. **Temperature Reader** read the temperature and tell the Data Recorder.
4. **Data Recorder** find the Cold Case Data Table and record the temperature in the "0:00" box.

Get Set...

5. **Mechanic** pick-up the container and thermometer by the **top handle** (not by the side) and hold it in the ice water for 5 minutes.

Go...

6. **Time Keeper** start the stop watch. Tell the Temperature Reader to read the Temperature ***every 30 seconds for 5 minutes***.
7. **Temperature Reader** read the temperature when told and report it to the Data Recorder.
8. **Data Recorder** record the temperature in the appropriate box.
9. Repeat steps 6 through 8 until 5 minutes are up.

Change Roles and repeat steps 1 through 9 for the Air container.
Change Roles and repeat steps 1 through 9 for the Steel Wool container.

If time permits, complete a Cold Stuff Data Sheet for each team member.
Place Worksheet and Data Sheets in Folder once complete.
We will analyze the data and make a conclusion tomorrow...

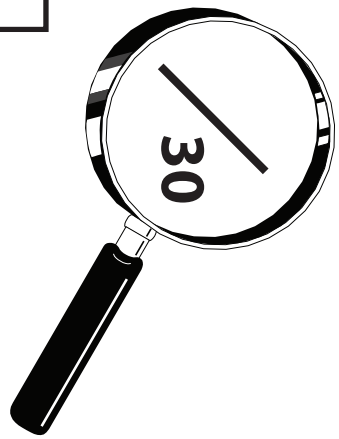
Name: _____

Period: _____ Table: _____

Cold Case Data Table

For each insulator:
- **Record** the Initial Temperature (somewhere near 20˚ C)
- **Start** the stopwatch when you put the insulator in the ice water
- **Record** the temperature **EVERY 30 SECONDS**
- **Stop** the stopwatch when it reaches 5 minutes

INSULATOR	*(initial temperature)*	TEMPERATURE of insulator at TIME (minutes:seconds)									
	0:00	0:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00
Cotton											
Air											
Steel Wool											



Name that VARIABLE!!

Directions: Identifiy the **Independent Variable**, **Dependent Variable**, **Constants** and **Control** of this experiment.

Independent Variable	
Dependent Variable	
Constants	
Control	

Cold Case Data Table

Cold Case Graph

Let's make a graph!

Directions: Make a **line graph** for each of the three insulators you tested. Graph one insulator at a time. Start by plotting the insulator's initial temperature. Then plot the insulator's temperature at 30 seconds, one minute, one and a half minutes, all the way to 5 minutes. Plot the other two insulators on the graph in the same way. You will have to make different symbols for each insulator so that you can tell them apart.

Cold Case Results Graph